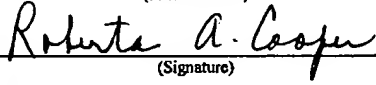




Atty. Dkt. No. 035451-0131 (3640.Palm)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Blight et al.
Title: RESOURCE LOCATION
THROUGH LOCATION
HISTORY
Appl. No.: 09/870,311
Filing Date: 5/30/2001
Examiner: Sanh D. Phu
Art Unit: 2682

CERTIFICATE OF EXPRESS MAILING	
I hereby certify that this correspondence is being deposited with the United States Postal Service's "Express Mail Post Office To Addressee" service under 37 C.F.R. § 1.10 on the date indicated below and is addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.	
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Roberta A. Cooper	
(Printed Name)	
	
(Signature)	

AFFIDAVIT OF ALISTAIR K.CHAN

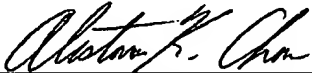
Commissioner for Patents
PO Box 1450
Alexandria, Virginia 22313-1450

Sir:

I, Alistair K. Chan, state and declare that:

1. I am a registered patent attorney (Registration No. 44,603) formerly employed by Foley & Lardner LLP.
2. While employed as a patent attorney at Foley & Lardner LLP, I drafted the above-referenced patent application.
3. Attached as Exhibit A is an e-mail from Henry Ohab, Senior Patent Counsel at Palm, Inc. to me dated March 27, 2001.
4. To the best of my recollection, the e-mail of Exhibit A was sent on the date that I was asked to prepare the above-referenced patent application.
5. At the time that I received the e-mail of Exhibit A, I had a backlog of patent applications, prosecution, and other work which I was working on.
6. I worked on the backlog in the time period of March 27, 2001 through May 20, 2001.
7. On May 21, 2001, I began work drafting the above-referenced patent application and worked on it regularly until I filed the patent application on May 30, 2001.

8. I hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are true, and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the patent application or any patent issuing therefrom.

Date: February 14, 2007 By: 
Alistair K. Chan, Ph.D., J.D.

Chan, Alistair K.

From: Henry Ohab [Henry.Ohab@corp.palm.com]
Sent: Tuesday, March 27, 2001 1:00 PM
To: 'achan@foleylaw.com'
Cc: David Blight; Elaine Lusher
Subject: 3640.Palm_ Accessing Peripherals based on Location History from a Wireless Networked Device



invention3.doc (49 KB) palmIDF-3.doc (97 KB)

Alistair, please prepare and file this case before 5/31/01.

David and Elaine, please note the docket number assigned for your records.

> -----Original Message-----
> From: David Blight
> Sent: Monday, March 26, 2001 11:07 PM
> To: Henry Ohab
> Subject: IDF
>
> <<invention3.doc>> <<palmIDF-3.doc>>

Palm, Inc. Invention Disclosure Form

5470 Great America Parkway, Santa Clara, CA. 95052.

Instructions:

- Any questions regarding this form should be referred to Henry Ohab at (408) 326-5501, Fax: (408) 326-5009, or E-mail Henry_Ohab@Palm.com
- Return Completed Form To: Henry Ohab

Date Stamp: _____

1. Title of the Invention Write a short descriptive title, avoiding coined terms and project names.

Location History System**2. Inventors**

Include the names of all persons who made a contribution to the conception of the invention.
If there are more than five inventors list at end of this form:

Full Name:	David Blight	M.S.10.3.02
Home Address:	460-304 Oak Grove Dr, Santa Clara, 95054	
Home Phone:	408-748-8035	Work Phone: 408-326-0131
Employee No.	25127	
Supervisor:	Elaine Lusher	Location:
Citizenship:	Canadian	:
Full Name:	Elaine Lusher	M.S.
Home Address:	456 Montori Court, Pleasanton, CA 94566	
Home Phone:	925-485-1788	Work Phone: 408-326-5693
Employee No.	03795	
Supervisor:	Frank Canova	Location: Santa Clara, CA
Citizenship:	USA	:
Full Name:		
Home Address:		
Home Phone:		Work Phone:
Employee No.		
Supervisor:		Location:
Citizenship:		:
Full Name:	M.S.	
Home Address:		
Home Phone:		Work Phone:
Employee No.		
Supervisor:		Location:
Citizenship:		:

This Invention Disclosure Form is submitted pursuant to your employment agreement with Palm, Inc. In accordance with said agreement, you have agreed to assign and hereby do assign all rights, title, and interest in the above described invention and any patent applications and patents based on this invention to Palm, Inc. and its subsidiaries.

Exhibit B

3. Conception of the Invention

Date of conception:

11.02.2000

Location of conception:

Santa Clara

4. Related Art

Is this invention an improvement of an existing COMPANY product?

No ☒ Yes ☐

If "Yes," identify the existing product:

and identify the improvement

What was the problem to be solved?

Short range wireless system may make resources available in selected areas. This invention allows the mobile device to navigate to where a previously discovered resource was detected so that it may be accessed

How had others attempted to solve it before you?

???

What were the problems or disadvantages with prior solutions?

???

What are the closest known prior art technology or products?

5. Reference Materials

List any printed publications, patents, patent applications or any other materials you are aware of which provides background material and/or prior art for your invention.

What other companies or inventors might have prior art?

6. Drawings of the Invention

Please submit clear drawings which illustrate the invention either by electronically inserting them below or by using supplemental sheets if you cannot electronically insert them.

Attached

7. Brief Description of the Invention

Describe the structure, function and/or method of the invention in just enough detail to enable someone technical to understand how you solved the problem. Explain how the invention solves the problem identified in Section 4 above.

Attached

8. Strategic/Tactical Value of the Invention

Very briefly, explain how this invention will have strategic value to the company. That is, how could such a patent help Palm, Inc. and/or how could such a patent adversely affect our competitors, both in the present and in the future?

The ability to store information about wireless resources detected through short range wireless technologies such as 802.11 or bluetooth may be a critical part of providing a good user experience in using such technologies. The ability to locate wireless services which are nearby is important in areas with spotty coverage, or multiple short range resources.

9. Joint Development or Development Contract

Was this invention jointly developed with inventors from another company? No ☒ Yes ☐

If "Yes," please identify the company and/or non-Palm inventors:

Expected/actual date of first public release or showing of invention or product incorporating or using the invention.

N/a

11. Publication of the Invention

Publication of a description of the invention may affect COMPANY's right to patent the invention. Submit this form even if publication has occurred.

Has a description been published or is it scheduled to be published?

No ☒ Yes ☐

If "Yes," when and to whom?

12. Attorney

If there is a particular patent attorney with whom you would like to work on this disclosure, suggest his/her name. Tony Murabito

This is a SUPPLEMENTAL INVENTOR SHEET which is to be used if there are more than 4 inventors for the invention set out in the Invention Docket specified above.

13. Additional Inventors Include names of all persons who made a contribution to the conception of the invention. If there are more than five inventors, use a Supplemental Sheet.

Full Name:	M.S.	
Home Address:		
Home Phone:	Work Phone:	
Employee No.		
Supervisor:	Location:	
Citizenship:	:	
Full Name:	M.S.	
Home Address:		
Home Phone:	Work Phone:	
Employee No.		
Supervisor:	Location:	
Citizenship:	:	
Full Name:	M.S.	
Home Address:		
Home Phone:	Work Phone:	
Employee No.		
Supervisor:	Location:	
Citizenship:	:	
Full Name:	M.S.	
Home Address:		
Home Phone:	Work Phone:	
Employee No.		
Supervisor:	Location:	
Citizenship:	:	
Full Name:	M.S.	
Home Address:		
Home Phone:	Work Phone:	
Employee No.		
Supervisor:	Location:	
Citizenship:	:	

Resource Location through Location History

One of the main difficulties of short range wireless devices such as Bluetooth or 802.11 is that the coverage area of each transmitter is relatively small. Short range wireless technology enables Personal Area Networks (PAN) in which small network is formed sharing resources in localized space. PANs are extremely effective for adhoc networks with stationary components (for example an office), or where all components move together (cell phone, PDA, and other mobile devices all attached to a user). A major difficulty of PAN technology is the interaction of mobile and stationary devices.

This invention involves a mechanism by which a mobile device records its location, and available resources associated with that location as it moves around. When a resource is needed, which is no longer accessible at the mobile devices current location, the mobile device is informed of one or more locations where the resource is available. Optionally a navigation application may be used to direct the mobile device to a location where the resource is available.

Requirements

1. The system should work with any location determinization method including (but not limited to):
 - a. GPS
 - b. Network enhanced GPS
 - c. Base station proximity
 - d. Triangulation
 - e. Time difference
 - f. And others
2. The system should be technology independent (work with Bluetooth, 802.11 or any other short range wireless technology)
3. Filtering of resources needs to supported.
4. Compression of recorded information.
5. Removal of old records.
6. Detection of moved resources
7. The system should be able to work with different radio characteristics (signal strength, antennas, sensitivity).
8. The system should be able to work with a map system, to provide navigation.

System

The central part of this invention is the database of resources and their locations.

The database should be storing information associated with both wireless stations (wireless transmitter) detected, and resources available through wireless stations. Any specific wireless station may have multiple resources associated with it, and likewise each resource may be available through multiple wireless stations. The following information may be in the database:

- Wireless station information
 - Wireless technology (Bluetooth, 802.11, etc)
 - Address (MAC address)
 - Location information
 - Location
 - Error
 - Location determination method
 - Resources associated with wireless station
 - Timestamp (last detection)
- Resource information
 - Resource identifier
 - Resource description. This description is used to describe the resource. It may be used in searching for particular resources.
 - Keywords
 - Attributes in an object oriented data description
 - tags
 - Associated wireless stations
 - Timestamp (last detection)

Location Information

The location of a wireless station is an important part of the database. One important issue is the resolution of measurements in the system, and the location determination. If the resolution is too fine grain, the database may become too large, and the coverage areas disjoint. If the resolution is too coarse, the results may be ambiguous and not useful.

- Location accuracy
- Variance in signal strengths (or coverage areas) of mobile devices.
- The physical environment

A typical measurement would include:

- Location
- Signal strength
- Resources.

There are multiple ways in which the location information may be stored.

- Store all recorded measurements. This is the simplest solution, but is not practical for reasons of memory requirements, and slow/complex searching algorithms.
- Store estimated location of resource and radius of coverage. This allows us only to store where the wireless station is thought to be. The aggregate x,y,z values are used to allow additional measurements to be inserted. No signal strength is used or stored.
 - Point and radius
 - Number of measurements
 - Aggregated x,y,x coordinates
- Boundary of coverage area. Allows for non symmetrical radiation patterns to be considered which may be significant in many environments. Requires more complex searching algorithms.
 - Polygon. The polygon represents a non circular (or spherical) coverage area. The shape of the polygon is determined by analysis of multiple measurements.

Search Algorithm

The search algorithm is responsible for find the closest resource station to the the mobile device's current location.

Input:

- Current location
- Desired resource
 - Preferences (optional)
- Selection criteria
 - Closest, last encountered,....

Output

- Location where resources can be accessed

Algorithm:

Search through the database and find a location where the specified resource may be accessed. This involved first matching the specified resource with those in the database. The matches are then compared to find the closest (or other selection criteria)

Database storage

The database collecting information may become too large for a memory limited mobile device (such as a palm). Options include:

- Compressing the database (discussed above)

- Removing entries. Filtering out less likely to be queried resources. Also filtering out similar entries (eg discard additional color printers once one is located)
- Filtering based on user preferences
- Splitting the database. Splitting the database into regions based on geography. Does not reduce memory consumptions, but makes database more manageable.
- Storing the database off device. The database (or certain entries) could be removed from the memory of the mobile device and placed in secondary memory (attached memory cards, disks, etc), or stored on a network based memory (database or entries transferred through wireless network to a remote sites).

Filtering

It should also be possible for the mobile device user to specify filters used in recording information and resources. The filters may be used to reduce the amount of information stored.

Database Maintenance

Records from the database may be removed when:

- They expire. The timestamp is past a user specified retention time.
- The wireless station moves. When a recording shows no wireless station is present, where it once was detected, the record may be removed.
- The resource is no longer available. When the mobile device detects that a resource is no longer available through a still present wireless station.
- The mobile user requests manual deletion
- A wireless station is detected where it was not present before.

Example 1

Consider a mobile device within an office complex. The mobile device has a Bluetooth transceiver in it. The mobile device is continually scanning for other Bluetooth devices.

When another Bluetooth device is detected (printer)

- The device is queried using a service discovery protocol to see what resources are available

The following information is recorded

- Current location
- MAC address of detected device/BT identifier
- List of available resources at this location

The recorded information is added to the history database

- Entry made for printer

- o Current location is added

When the mobile device moves out of range of the printer, The following information is recorded

- Current location
- MAC address of detected device
- List of available resources at this location

The recorded info is added to the history database

The history database information associated with the printer is analyzed.

When the mobile device is queried for the location of a printer

- The history database is queried for a location of a printer, and the current location is supplied
- The history database responds with a location matching the preferences (in this case defaults, closest physical)

The history database may open up a graphical navigation tool to direct the mobile device to the resource location. The navigational tool could be a complex mapping system or a simple bit map based diagram with relative locations superimposed.

The mobile user may wish to save the database for future use (this could be an automatic process or manual). When he moves to new location, a new database is created. When he returns, he may reload the database to remember where resources were.

Example 2

A mobile device is turned on for the first time in a corporate campus. When in range of a BT access point, a mobile device could download a database from the network with location of services identified.

The user does not need to roam around to find resources. If he needs a printer, he may use the downloaded database to find the closest resource.

If a new resource is found, the database may be augmented

If a resource is discovered missing, it may be removed from the database. The removal may not be immediate, depending upon the stability of environment.

Example 3

A mobile device is moving through a metropolitan area. As the device travels it occasionally picks up information from local commercial entities (stores, restaurants).

The mobile device may wish to not only record that a Bluetooth information source was found, but what type of enterprise it is, and what they sell.

For example the following info could be recorded:

- Restaurant: Location, and any information about the menu that was available
- Store: Type and some items for sale.

The mobile uses may want to query for restaurant. The database on the mobile device may be required for any restaurants that were found nearby (and optionally for certain types of food).

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